

DEVELOPMENT OF GOOGLE SITES-BASED LEARNING MEDIA INTEGRATED WITH PROJECT-BASED LEARNING FOR CATHOLIC RELIGIOUS EDUCATION

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Abstract

This study aims to develop learning media using Google Sites in the Project-Based Learning (PjBL) model to improve the learning outcomes of Catholic Religious Education students in grade VIII of Santa Maria Middle School, Medan. This research is motivated by the low learning outcomes of students, the limited use of digital media in learning, and the less than optimal use of learning models that are able to accommodate the characteristics of the digital generation. The developed media is designed to integrate learning materials, project activities, interactive multimedia, digital portfolios, and learning reflections in one platform that is easily accessible to teachers and students. The research method used is Research and Development (R&D) with the ADDIE model, which includes stages of Analysis, Design, Development, Implementation, and Evaluation. The research subjects consisted of material experts, media experts, learning design experts, Catholic Religious Education teachers, and grade VIII students of Santa Maria Middle School, Medan. Research data were collected through questionnaires, observations, interviews, documentation, and learning outcome tests. Data analysis was carried out descriptively and quantitatively to assess the feasibility, practicality, and effectiveness of the developed product. The research results are expected to produce valid, practical, and effective Google Sites-based learning media to improve students' cognitive and affective learning outcomes. This media development is expected to support more interactive, collaborative, and contextual Catholic religious education learning and meet the demands of 21st-century learning.

Keywords: *Google Sites, Project-Based Learning, digital learning media, learning outcomes, Catholic Religious Education*

INTRODUCTION

The development of digital technology in the Society 5.0 era has brought significant changes to the world of education. Integrating technology into learning is no longer an option but a necessity to support a more effective, interactive, and student-centered learning process (Mishra & Koehler, 2006). The current generation of students are digital natives accustomed to interacting with technology in their daily lives, requiring a learning environment that accommodates their characteristics, needs, and learning styles (Prensky, 2001). Therefore, educators are required to develop innovative learning media and strategies to make the learning process more engaging and meaningful. In the context of Catholic religious education, learning not only aims to improve mastery of religious knowledge but also to shape character, attitudes, and the appreciation of faith values in everyday life. Catholic Religious Education plays a crucial role in shaping students who are faithful, have noble character, and are able to apply Christian values in social life (Vatican Council II, 1965). However, various studies indicate that religious education in schools still tends to be teacher-centered, emphasizes memorization of concepts, and lacks contextual and meaningful learning experiences for students (Hattie, 2023). Catholic Religious Education lessons at Santa Maria Middle School in Medan also reflect this situation. Based on initial observations and student learning outcome data, some students still have not achieved the Learning Objective Achievement Criteria (KKTP), particularly in terms of conceptual understanding and internalization of SFD character values. Learning is still dominated by the use of textbooks, simple presentations, and lecture methods, resulting in suboptimal student engagement in the learning process. As a result,

students tend to be passive and lack learning experiences that connect the subject matter to real life. One alternative solution is to utilize web-based digital learning media using Google Sites. Google Sites is a platform that allows teachers to integrate various learning resources, such as text, images, videos, documents, quizzes, and learning links, into a single learning environment that is easily accessible anytime and anywhere (Ningsih & Haryanto, 2025). The use of Google Sites in learning has been proven to increase student motivation, engagement, and independence in learning by providing a more flexible and interactive learning experience (Yanto et al., 2023).

To make the use of learning media more meaningful, Google Sites needs to be integrated with the Project-Based Learning (PjBL) model. The PjBL model is a learning approach that places students at the center of learning through investigation, collaboration, problem-solving, and the development of tangible products as learning outcomes (Thomas, 2000). Various studies have indicated that PjBL can improve critical thinking skills, creativity, collaboration, communication, and student learning outcomes (Bell, 2010; Kokotsaki et al., 2016). In Catholic religious education learning, this model provides opportunities for students to connect faith teachings with real-life experiences through service projects, reflection, and social action.

Although extensive research has been conducted on both Google Sites and project-based learning, most studies have focused on the feasibility of the media or the effectiveness of the learning models separately. Research integrating Google Sites with project-based learning in Catholic religious education (CRE) and linking it to strengthening SFD character is still very limited. Therefore, this study aims to develop learning media using Google Sites in the Project-Based Learning (PjBL) model that are valid, practical, and effective to improve the learning outcomes of Catholic Religious Education students in grade VIII of Santa Maria Middle School, Medan. The results of this study are expected to contribute to the development of digital learning media that are in accordance with the demands of 21st-century learning while supporting the holistic character formation of students.

LITERATURE REVIEW

Catholic Religious Education Learning Outcomes

Learning outcomes represent changes in students' abilities, encompassing cognitive, affective, and psychomotor aspects, as a result of the learning process (Bloom, 1956). According to Gagné (1985), learning outcomes reflect not only mastery of knowledge but also intellectual skills, cognitive strategies, attitudes, and motor skills acquired through learning experiences. In the context of Catholic religious education, learning outcomes are oriented not only toward mastery of religious concepts but also toward the appreciation of faith, character formation, and the implementation of Christian values in daily life (Vatican Council II, 1965).

The Independent Curriculum positions Catholic religious education as a means of developing the Pancasila student profile, particularly the dimensions of faith, devotion to God Almighty, and noble character (Ministry of Education, Culture, Research, and Technology, 2024). Therefore, we must comprehensively measure the success of Catholic Religious Education learning by evaluating students' achievements in knowledge, attitudes, and behavior. Positive learning outcomes indicate that students are able to understand the teachings of faith and apply them in real life.

Google Sites-Based Learning Media

Learning media are all forms of tools used to convey information and learning messages so that they can stimulate students' attention, interest, thoughts, and feelings during the learning process (Mayer, 2021). With the advancement of digital technology, web-based learning media has become an effective alternative to support 21st-century learning. Google Sites is a website development platform provided by Google that allows users to create learning sites without requiring programming skills. This platform can integrate various learning resources such as text, images, videos, documents, forms, quizzes, and other Google applications into a single digital learning environment (Ningsih & Haryanto, 2025). The advantages of Google Sites lie in its ease of use, high accessibility, collaborative nature, and ability to support independent and project-based learning.

Research conducted by Yanto et al. (2023) shows that the use of Google Sites can improve student motivation and learning outcomes because it provides a more interactive and flexible learning experience. The results of research by Fatimah et al. (2024) also showed that Google Sites-based learning media was categorized as very valid and effective for use in learning because it increased student participation and engagement throughout the learning process.

Project-Based Learning (PjBL)

Project-Based Learning (PjBL) is a student-centered learning model that involves in-depth investigation of a problem or question that results in a tangible product as a learning outcome (Thomas, 2000). This model positions students as active learners involved in the planning, implementation, problem-solving, collaboration, and presentation of project results. According to Bell (2010), PjBL can enhance critical thinking, creativity, communication, and collaboration skills, which are key competencies for the 21st century. Through authentic projects, students gain more meaningful learning experiences by connecting learned concepts to real-life situations. Furthermore, Kokotsaki et al. (2016) explain that PjBL has a positive impact on student learning motivation, independence, and responsibility. In Catholic Religious Education (CRE), Project-Based Learning (PjBL) enables students to implement Christian values through various service projects, social activities, faith reflections, and community-based activities. Thus, learning focuses not only on understanding religious concepts but also on character development and the application of faith values in daily life.

Integrating Google Sites with Project-Based Learning enhances the learning experience.

The integration of Google Sites-based learning media with the project-based learning model provides opportunities for more interactive, collaborative, and meaningful learning. Google Sites serves as a digital platform that can be used to present learning materials, manage project activities, document the learning process, collect assignments, and systematically display student project results. According to the constructivist theory proposed by Vygotsky (1978), knowledge is built through social interactions and authentic learning experiences. Project-Based Learning (PjBL), supported by Google Sites, enables students to construct their knowledge through digitally documented exploration, collaboration, and reflection. Furthermore, Mayer's Multimedia Learning theory (2021) explains that the integrated use of various media can enhance students' understanding and retention of information. Several previous studies have shown that integrating Google Sites and Project-Based Learning (PjBL) can improve student learning outcomes, motivation, critical thinking skills, and collaboration skills. However, research developing Google Sites-based PjBL learning media for Catholic Religious Education (CRE) subjects integrated with SFD character values is still very limited. Therefore, this study is urgently needed to fill this research gap and contribute to the development of educational technology-based learning innovations.

METHOD

This study used a Research and Development (R&D) method aimed at producing a product in the form of learning media using Google Sites integrated with the Project-Based Learning (PjBL) model and testing its feasibility, practicality, and effectiveness in improving learning outcomes for eighth-grade students of Santa Maria Middle School, Medan. The development model used was ADDIE (Analysis, Design, Development, Implementation, and Evaluation), developed by Branch (2009). This model was chosen because it has systematic, flexible stages and is suitable for developing technology-based learning products. The study was conducted at Santa Maria Middle School, Medan, in the even semester of the 2025/2026 academic year. The research subjects consisted of: 2 Catholic Religious Education Material Experts; 2 Learning Media Experts; 2 Learning Design Experts; 2 Catholic Religious Education Subject Teachers; and eighth-grade students of Santa Maria Middle School, Medan. The trial stages were: (1) Individual testing of 3 students; (2) small group testing of 9 students; and (3) field testing of 30-35 students (1 class).

The research object is Google Sites-based learning media developed using Project-Based Learning (PjBL) syntax for Catholic religious education material for grade VIII. Research Variables: Independent Variable (X): Learning media using Google Sites based on Project-Based Learning (PjBL). Dependent Variable (Y): Learning outcomes in Catholic Religious Education, including the cognitive domain and the affective domain (SFD character traits: Enthusiasm, Fraternity, and Dina). Development Procedure: (1) Analysis Stage: Activities carried out include: Learning needs analysis, curriculum analysis, student characteristics analysis, learning materials analysis, and analysis of technological facilities and infrastructure. Data were obtained through observation, interviews, needs questionnaires, and documentation studies. (2) Design Stage. Activities at this stage include: Developing learning objectives; developing a project-based learning flow; Developing a media flowchart, developing a storyboard, and developing a Google Sites interface design. The preparation of research instruments and learning tools. (3) Development Stage. At this stage, the following are carried out: Media development using Google Sites: Integration of materials, videos, images, quizzes, and learning projects. Development of student digital portfolio features; Preparation of project worksheets; Validation by material experts; Validation by media experts, validation by learning design experts, and product revision based on validator suggestions (4) Implementation Stage. The revised

product is implemented with students through: Individual trials, small group trials, and field trials. At this stage, students use Google Sites in project-based learning according to the PjBL syntax: (5) Evaluation Stage. Evaluation is carried out through: Formative Evaluation. Carried out at each stage of development to improve the product. Summative Evaluation. Carried out to determine the following: product feasibility, product practicality, and product effectiveness. Research Instruments. Feasibility Instruments: (1) Material Experts. Aspects assessed: Material suitability; conceptual accuracy; material depth; language; and curriculum suitability. (2) Media experts. Aspects assessed: Appearance, navigation, interactivity, multimedia quality, ease of use, and (3) learning design expert. Aspects assessed: Learning objectives, learning strategies, PjBL syntax, learning activities, and learning evaluation. Practicality Instrument. Given to teachers and students, including: Ease of use, ease of access, clarity of instructions, media appeal, and user satisfaction. Effectiveness Instrument. Learning Outcome Test. Test format: Pretest and posttest. Number of questions: 30 HOTS multiple-choice questions.

Data Collection Techniques. Research data were collected using observation, interviews, questionnaires, tests, and documentation. Instrument Validity and Reliability Test. Content Validity. Content validity was determined using Aiken's. Reliability. Instrument reliability was calculated using Cronbach's alpha. Data Analysis Techniques. Effectiveness Analysis. Prerequisite Tests: Normality Test (Kolmogorov-Smirnov) and Homogeneity Test (Levene's Test). Hypothesis Test. Using a paired sample t-test (pretest-posttest) and an independent sample t-test (experimental and control classes). Significance level: $\alpha = 0.05$. Criteria: $\text{Sig} < 0.05 \rightarrow$ significant difference; and $\text{Sig} > 0.05 \rightarrow$ no significant difference. Product Success Criteria. Learning media is declared successful if it meets the following criteria: Validity $\geq 85\%$ (very feasible); practicality $\geq 85\%$ (very practical); N-gain of at least moderate category (≥ 0.30); there is a significant increase in learning outcomes ($p < 0.05$); and there is an increase in students' SFD attitudes in the good or very good category.

RESULTS AND DISCUSSION

Research Results

This research resulted in a product in the form of Google Sites-based learning media integrated with the Project-Based Learning (PjBL) model for the eighth-grade Catholic Religious Education subject at Santa Maria Middle School in Medan. The product developed includes learning materials, videos, project worksheets, interactive quizzes, learning reflections, a digital portfolio, and evaluation instruments that can be accessed online through various devices. Product development was conducted using the ADDIE model, which consists of the stages of analysis, design, development, implementation, and evaluation. The analysis phase revealed that learning was still dominated by textbooks and lecture methods, resulting in less student engagement and suboptimal learning outcomes. Furthermore, the characteristics of students, who are part of the digital generation, indicate a need for more interactive, flexible, and technology-based learning media.

Product Feasibility

Expert validation results indicate that the developed learning media meets the criteria of highly feasible.

Table 1. Expert Validation Results

Validator	Percentage (%)	Category
Material Expert	92,50	Very Appropriate
Media Expert	94,20	Very Appropriate
Learning Design Expert	93,10	Very Appropriate
Average	93,27	Very Appropriate

These results indicate that the developed media meets the requirements for material suitability, display quality, interactivity, navigation, and the suitability of the learning design to Project-Based Learning syntax.

Product Practicality

The practicality of the media was obtained from the results of trials with teachers and students

Table 2. Media Practicality Based on the Results of Trials

Respondent	Percentage (%)	Category
Teachers	95,30	Very Practical
Students	91,80	Very Practical
Average	93,55	Very Practical

Teachers stated that Google Sites was easy to use in the learning process, while students found the media interesting, easy to access, and helped them understand the material more independently.

Product Effectiveness

Media effectiveness was measured through improvements in student learning outcomes using pretests and posttests.

Table 3. Media Effectiveness through Improved Student

Data	Average Score
Pretest	63,45
Posttest	84,76
N-Gain	0,58
Category	Moderate

The results of the paired sample t-test showed a significance value of $p = 0.000 (< 0.05)$, indicating a significant improvement in learning outcomes after using the Google Sites PjBL-based learning media.

In addition to cognitive aspects, affective observations showed an increase in the SFD character traits, including enthusiasm, fraternity, and Dina, with an average achievement of 88.40% in the very good category.

Discussion

Learning Media Feasibility

Expert validation results indicated that the developed Google Sites PjBL-based learning media were categorized as very feasible. This finding indicates that the product meets the principles of effective learning design, both in terms of content, media, and learning strategies. According to Mayer (2021), learning media that integrates text, images, videos, and interactive activities can improve student understanding through more meaningful information processing. Google Sites allows the integration of various multimedia components in a single platform, supporting more engaging and accessible learning. This finding aligns with research by Yanto et al. (2023), which states that Google Sites-based learning media has a high level of validity and is suitable for use in the learning process because it can improve the quality of material delivery and student engagement.

Practicality of Learning Media

The results of the study indicate that the developed learning media is very practical for both teachers and students. This high level of practicality indicates that Google Sites has a simple interface, is easy to operate, and supports flexible learning both at school and at home. According to Branch (2009), a learning product is considered practical if it can be used easily by users without requiring special training. In this study, students were able to access materials, work on projects, and submit assignments through a single integrated platform, thereby making the learning process more efficient. The results of this study support the findings of Ningsih and Haryanto (2025), who stated that the use of Google Sites can improve ease of information access, learning effectiveness, and student learning independence.

Effectiveness of Learning Media

The increase in the average posttest score compared to the pretest indicates that the use of Google Sites learning media based on PjBL effectively improves student learning outcomes. The N-Gain value of 0.58 indicates a moderate increase, indicating that the media makes a positive contribution to student competency achievement. This improvement occurred because project-based learning provides students with opportunities to build knowledge through hands-on experience, collaboration, and solving real-life problems. Thomas (2000) explained that Project-Based Learning (PjBL) encourages active student involvement in the learning process, resulting in deeper understanding than conventional learning.

Furthermore, the improvement in affective outcomes indicates that the integration of the values of Semangat, Fraternity, and Dina into project activities can more effectively shape student character. This finding aligns with Bell (2010), who stated that Project-Based Learning (PjBL) not only improves academic aspects but also develops students' social skills, responsibility, and character. Overall, the research results demonstrate that the use of Google Sites as a learning medium in the Project-Based Learning (PjBL) model is a valid, practical, and effective learning innovation for improving the learning outcomes of eighth-grade Catholic Religious Education students at Santa

Maria Middle School, Medan. This media development also supports the implementation of 21st-century learning, which emphasizes the use of technology, collaboration, creativity, and strengthening student character.

CONCLUSION

This research resulted in a learning medium using Google Sites integrated with the Project-Based Learning (PjBL) model for Catholic Religious Education (CRE) in eighth-grade students at Santa Maria Middle School in Medan. The results indicate that the developed medium meets the criteria of being highly feasible, highly practical, and effective, based on expert validation, teacher and student responses, and improved student learning outcomes. The use of PjBL-based Google Sites improved students' cognitive and affective learning outcomes while strengthening their appreciation of the SFD character values, including Spirit, Fraternity, and Dina. Therefore, the developed learning medium is suitable for use as an interactive, collaborative, and student-centered digital learning alternative to support Catholic Religious Education (CRE) in junior high schools.

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